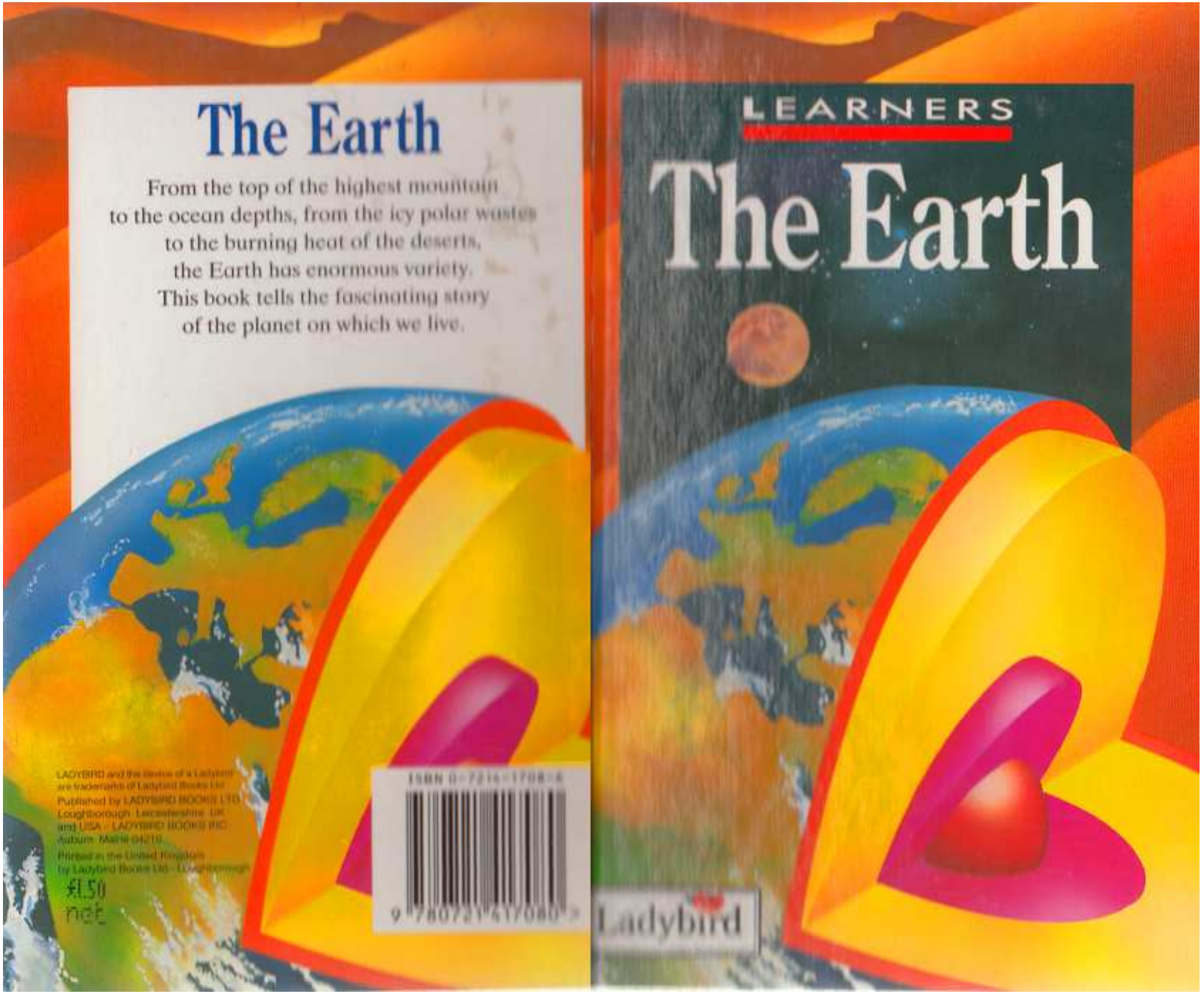
The Earth
From the top of the highest mountain
to the ocean depths, from the icy polar wastes
to the burning heat of the deserts,
the Earth has enormous variety.
This book tells the fascinating story
of the planet on which we live.
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Loughborough Leicestershire UK
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Auburn Maine 04210
Printed in the United Kingdom
by Ladybird Books Ltd Loughborough
£1.50
ISBN 0-7214-1708-X
9 780721 417080
LEARNERS
The Earth
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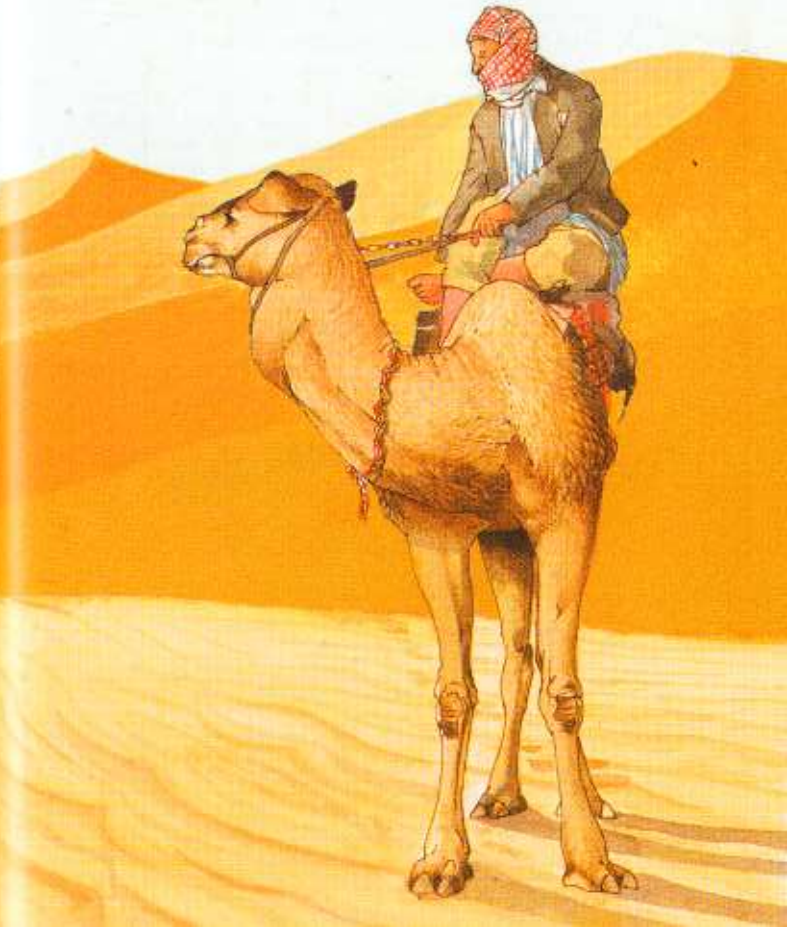
Contents



Words printed in **bold** are explained in the glossary.

Acknowledgments

The publishers would like to thank Wendy Body for acting as reading level consultant.

Photographic credits

Page 41, Cameron Balloons; pages 13 (bottom), 14, 30, 35 (2) and 36, J Allan Cash; page 13 (top), Dr A J Crosbie; pages 11 and 28, Robert Harding Picture Library; page 34, Dr N Hulton; page 31 (top right), Dr T Jennings (author); page 31 (top left), G Morris; page 37, Dr Ian Morrison; pages 19 and 29, Popperfoto. Drawing on page 40 by Robin Davies; drawings on pages 10 and 41 by Mick Usher.
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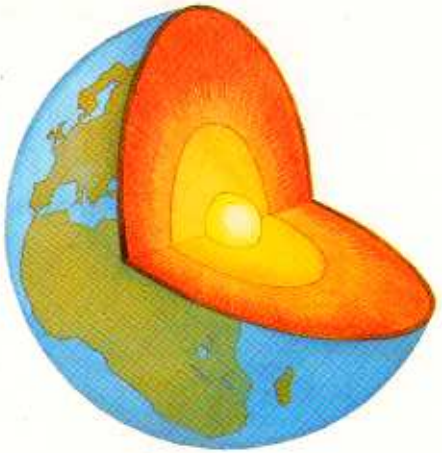
A catalogue record for this book is available from the British Library

Published by Ladybird Books Ltd Loughborough Leicestershire UK
Ladybird Books Inc Auburn Maine 04210 USA

The Earth

written by Dr TERRY JENNINGS
illustrated by DAVID COOK



Ladybird

The Earth

The Earth we live on is like a huge ball, spinning in space.

When you stand on the ground you can't see what shape the Earth is. But if you were an astronaut in a spacecraft you would be able to see that the Earth is round.

The **Equator** is an imaginary line that divides the Earth into two equal halves. The opposite ends of the Earth are called the Poles.

The top half of the Earth is called the northern hemisphere.

North Pole

Equator

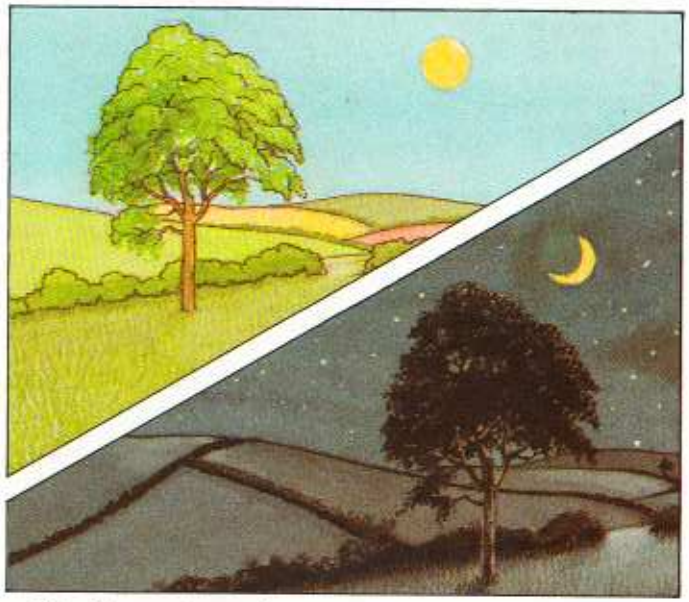
The bottom half of the Earth is called the southern hemisphere.

South Pole

Day and night

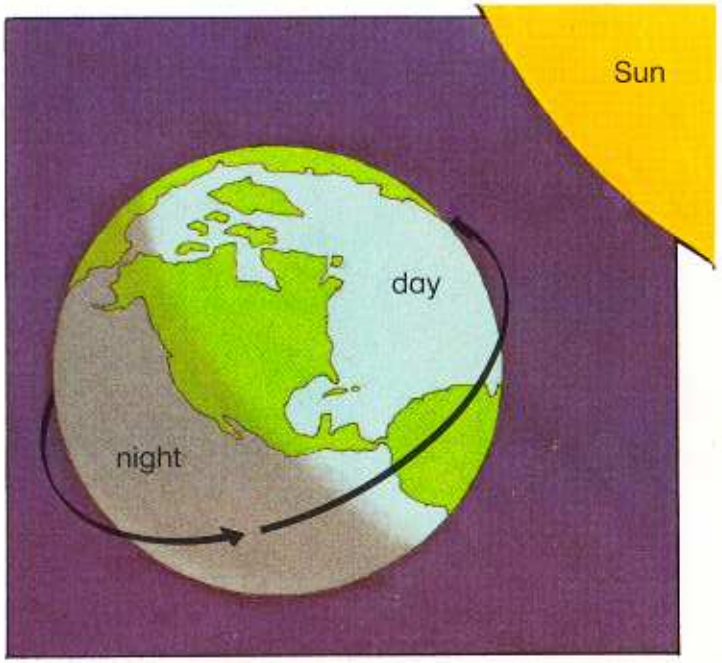
Our Earth is spinning all the time, like a giant top. It takes twenty four hours (one day) to make one complete turn.

The Sun is much bigger than the Earth. It doesn't look it because it is so far away.



The Moon is much nearer to us, and is smaller than the Earth.

The Sun shines on one half of the Earth at a time. There, it is daytime. The other half of the Earth is in shadow. There, it is night.

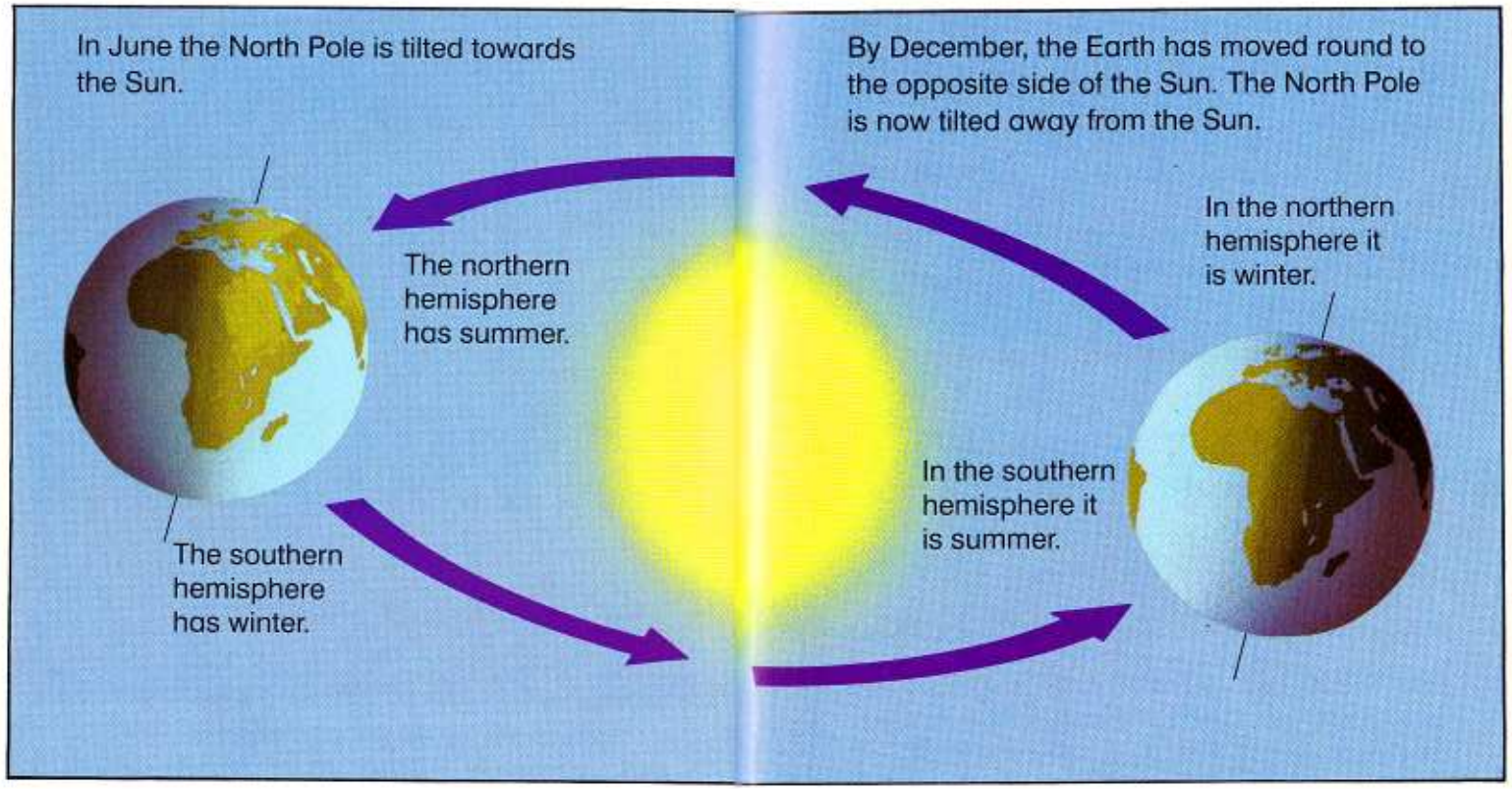


Sunlight travels in straight lines. It can't go round corners, so there are always dark shadows behind things that stand in its way.

The seasons

Not only does the Earth spin like a top, it also moves round the Sun. The Earth takes one year to go completely round the Sun.

The Earth is slightly tilted. As it moves round the Sun, different parts of the Earth are tilted towards the Sun. This is what gives us the **seasons**.

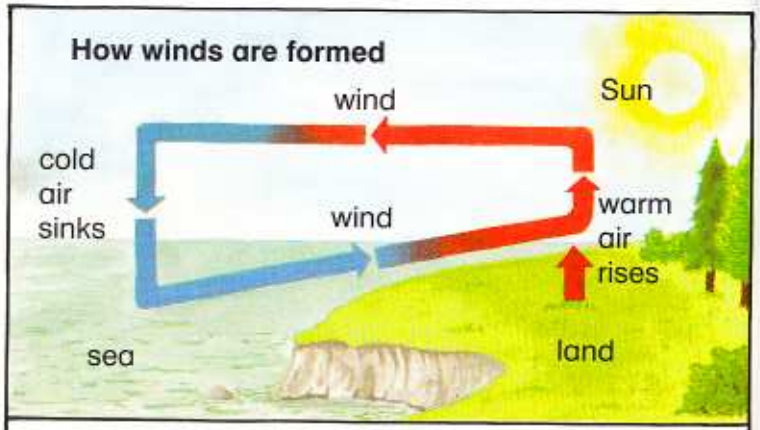


Moving air

The air around us is always moving, helping to spread the Sun's heat round the world. Moving air is called wind. Together with sunlight and water, it is one of the main ingredients in the world's **weather**.

A hurricane in Sri Lanka

The strongest winds of all are called hurricanes. These happen in hot sea areas such as the Caribbean and the Indian Ocean. The wind can reach speeds of 300 km per hour, destroying houses and crops in its path.



The Sun warms up the air and the land. The warm air rises. Cold air then rushes in to take its place.

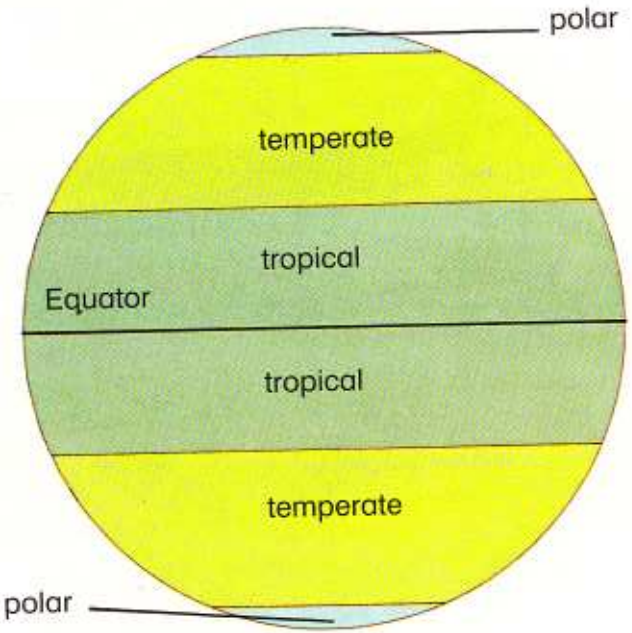
Beaufort Scale of Wind Speeds

Force	Strength	Speed (kph)	Effect
0	Calm	0–1	
3	Gentle Breeze	20	
6	Strong Breeze	50	
8	Gale	75	
10	Storm	100+	

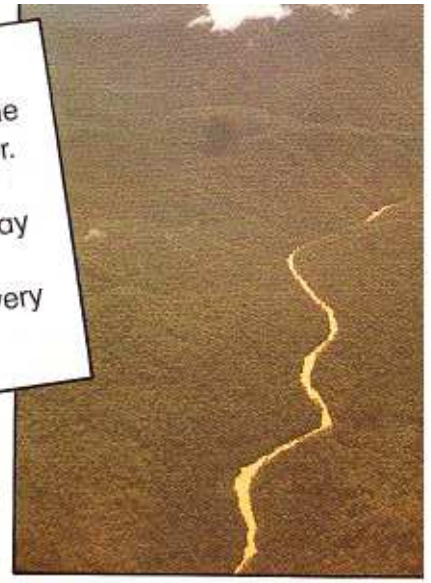
Climate

The pattern of the weather in a particular place is called its **climate**.

Different parts of the world have different climates. The three main types of climate are tropical (hot and wet), polar (cold and icy) and temperate (mild).



The hottest places are around the middle of the Earth, near the Equator. This is because the Equator never tilts away from the Sun. These places may also be very wet.



A rainforest in Papua New Guinea ▶

Mount Kilimanjaro, Tanzania, Africa ▼

The higher you go, the colder it gets. Some high mountains, even in warm places, always have snow at their tops.

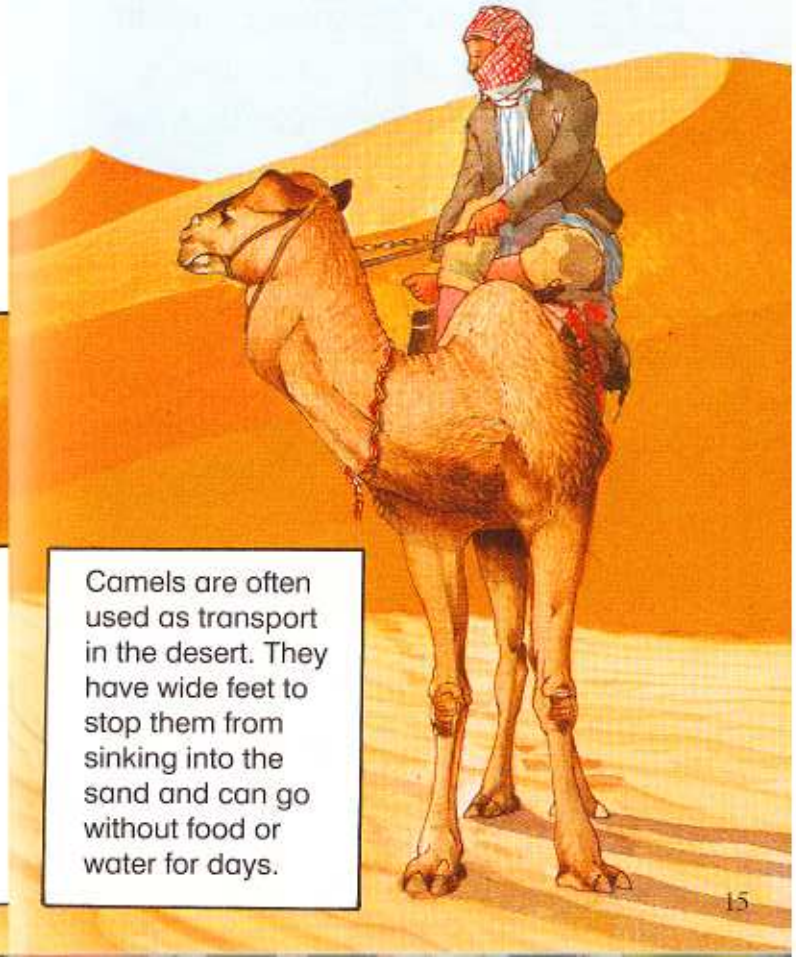
The deserts

Deserts cover about one third of the Earth's land. Some are cold and dry, but most are the hottest and driest places in the world. The Sahara, in North Africa, is the world's largest desert. It covers about 7,700,000 sq km. This is about one third of Africa.

Cacti grow in some deserts. They are able to survive because they can store water in their thick, waxy stems.

A Mexican Cardon cactus

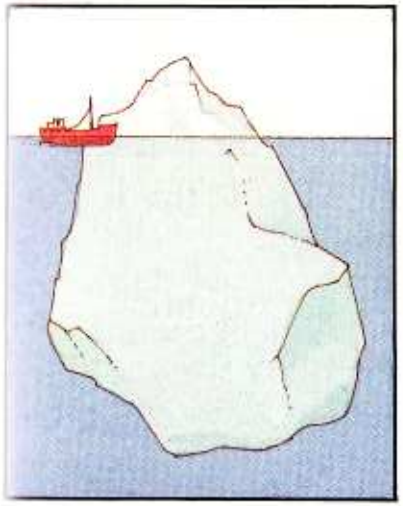
Some deserts are covered with rocks and pebbles, others with sand. Sandy deserts are shaped by the wind. It blows the sand into huge piles called sand dunes. The highest sand dunes are in the Sahara Desert. They are over 400 m high.



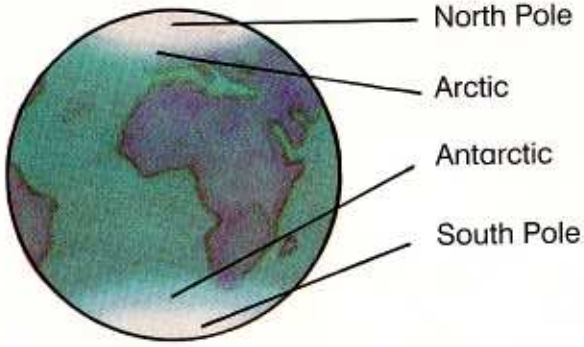
Camels are often used as transport in the desert. They have wide feet to stop them from sinking into the sand and can go without food or water for days.

The Poles

The Poles lie at the top and bottom of the Earth. The area round the North Pole is called the Arctic. There is no land here, just a huge floating sheet of ice. The area round the South Pole is called the Antarctic. The land here is covered with ice, up to 4 km thick in places.



Icebergs are huge chunks of ice that float in the sea round the Poles. Only about one ninth of an iceberg shows above the water, so ships have to be very careful to avoid them.

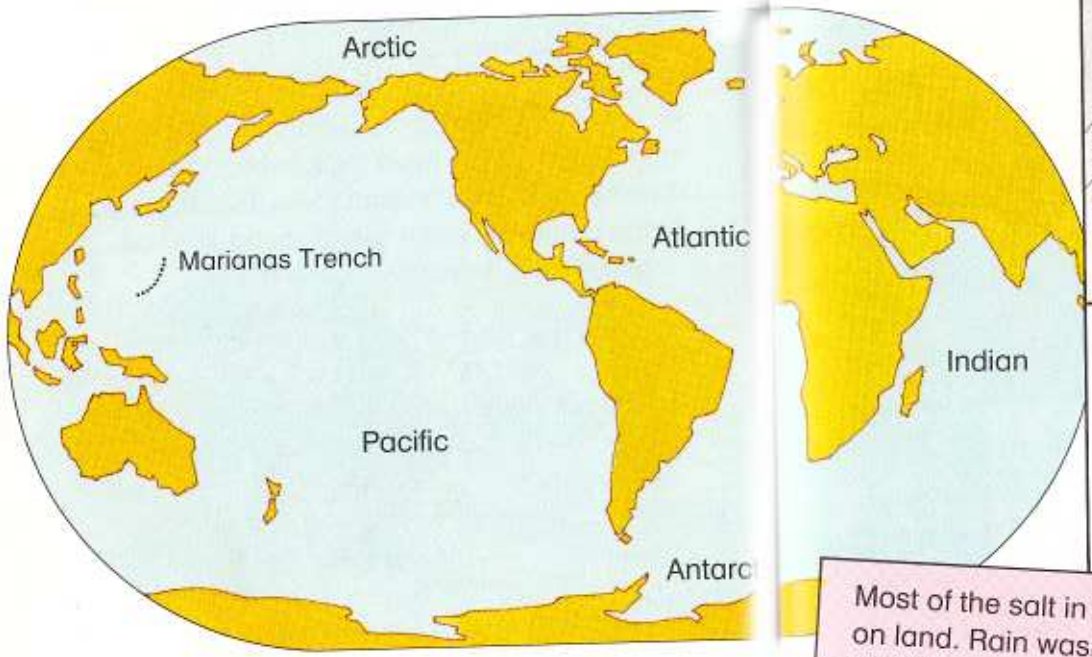


The Poles are the coldest places on Earth. Temperatures never rise above freezing and can drop as low as –50°C.

In spite of the cold, polar bears and seals live in the Arctic. They have thick layers of fat under their skin to protect them from the cold. At the other end of the world, penguins live happily in the Antarctic.

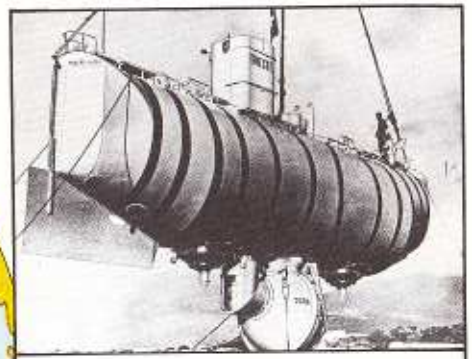
Oceans and seas

Nearly three quarters of the Earth is covered by water. Most of this is the salty water of the five **oceans** – the Pacific, the Atlantic, the Indian, the Arctic and the Antarctic.



The Pacific is the largest ocean. The Marianas Trench in the Pacific Ocean is the deepest point on Earth. It is 11,033 m below sea level. The water here is pitch black and very cold.

The bathyscape *Trieste*

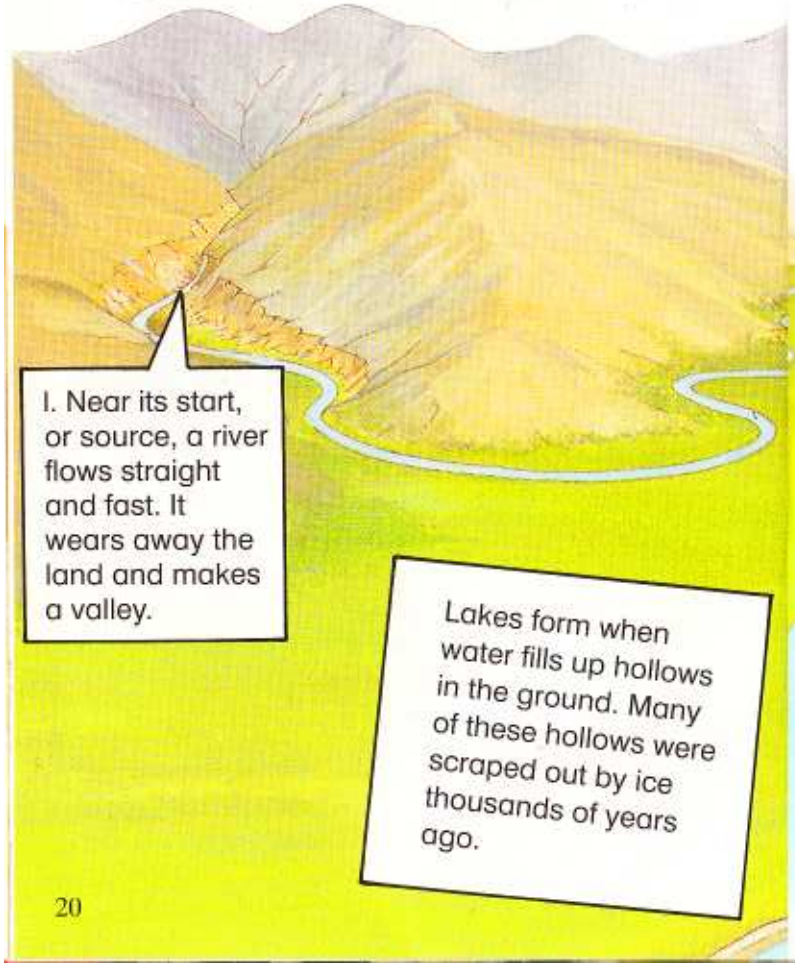


A bathyscape is a type of small submarine. In 1960 the crew of the bathyscape *Trieste* dived almost to the bottom of the Marianas Trench.

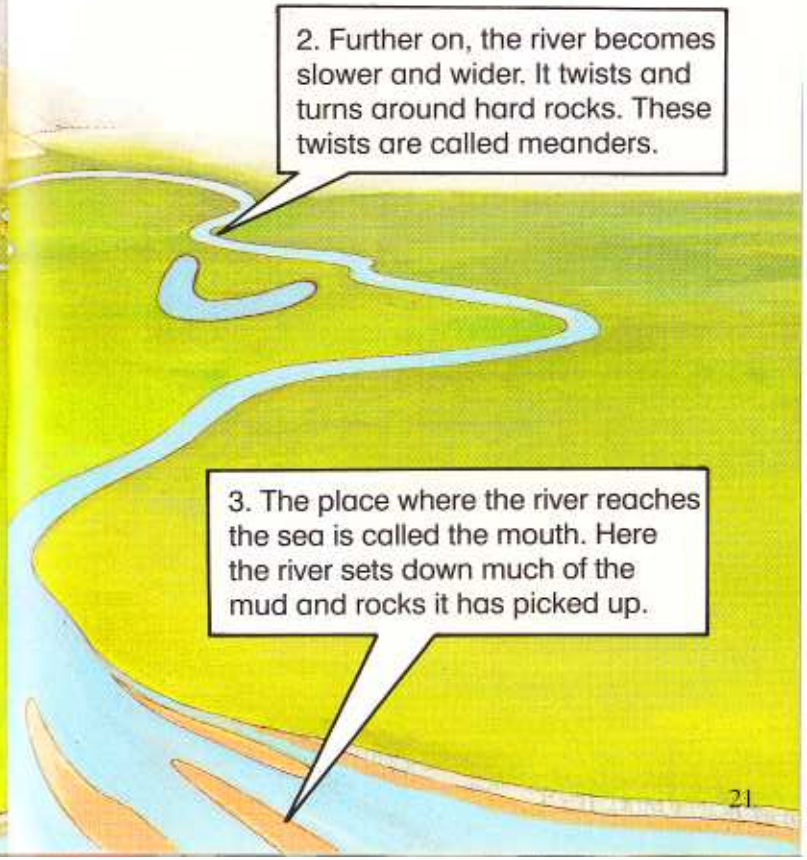
Most of the salt in sea water comes from rocks on land. Rain washes the salt out of the rocks and rivers carry it to the sea.

Fresh water lakes and rivers

Most lakes and all rivers are filled with fresh water.

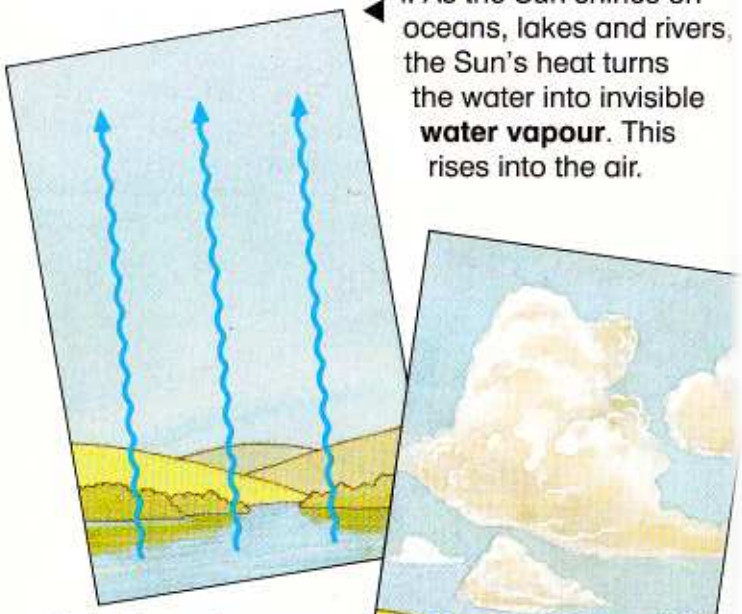


The water falls as rain or snow and has no salt in it. Rivers start as small streams in hills and mountains. As the streams flow downhill, they join together to form rivers, which flow towards the sea.



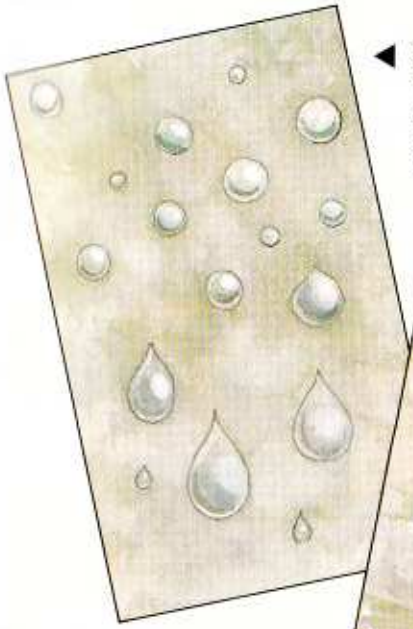
The water cycle

The Earth has only a limited supply of water, which is used over and over again. The way this happens is called the **water cycle**.

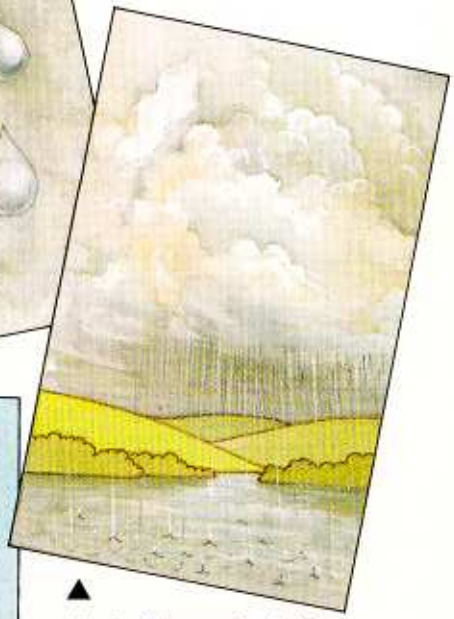


1. As the Sun shines on oceans, lakes and rivers, the Sun's heat turns the water into invisible **water vapour**. This rises into the air.

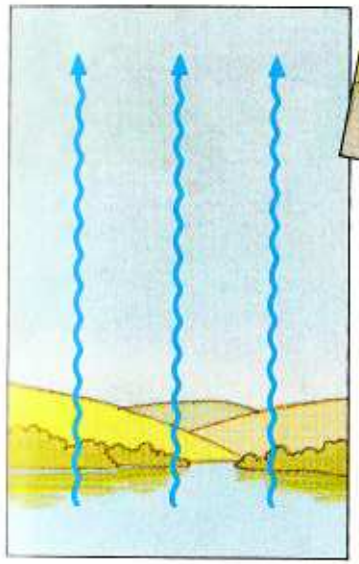
2. As the water vapour rises, it cools and turns back into tiny droplets of water. These form clouds.



3. The cloud droplets join together until they are big enough to fall as rain, hail or snow.



4. As the water falls back to Earth, it refills the oceans, lakes and rivers.



5. The whole water cycle begins again.

Inside the Earth

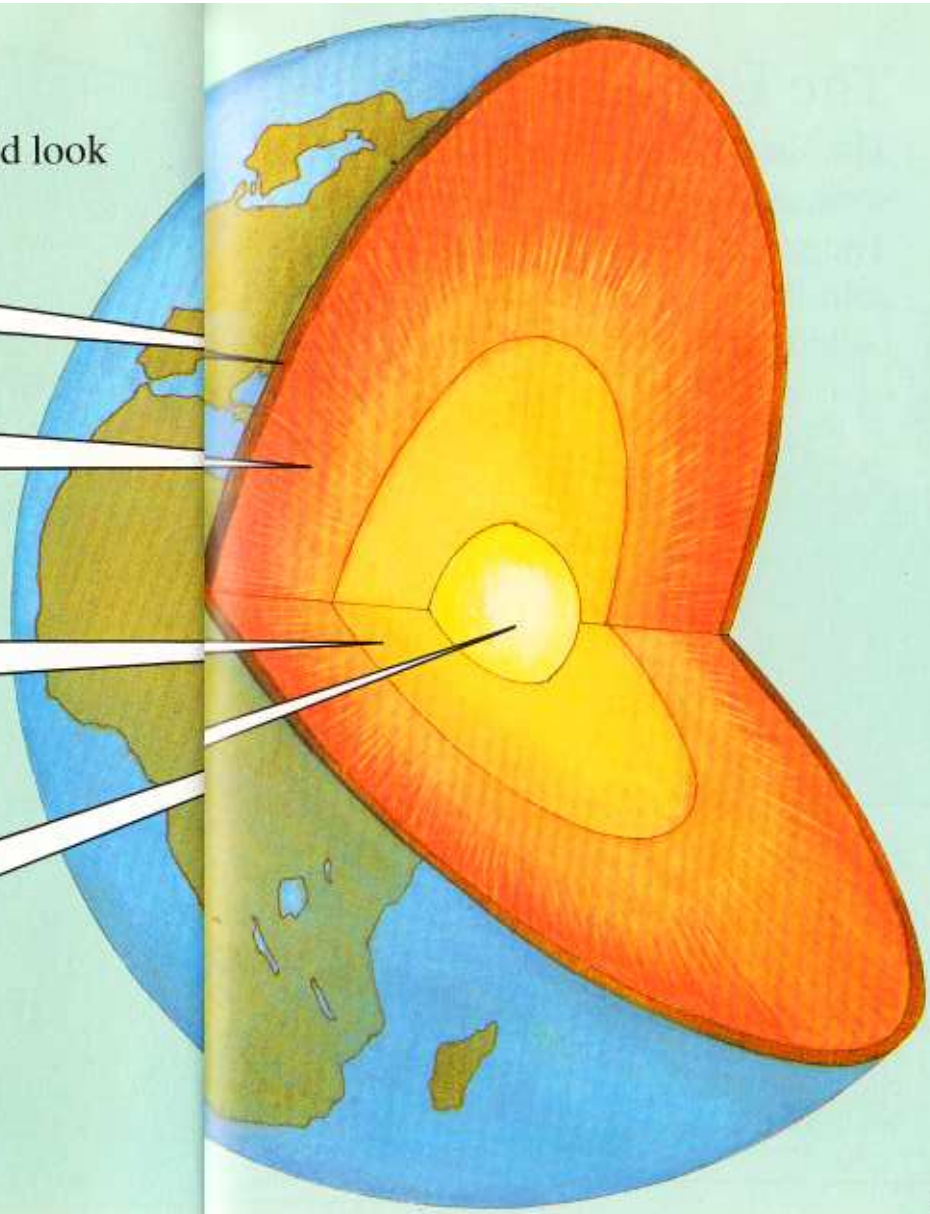
This is what the Earth would look like if we cut it open.

The hard top layer is called the crust.

Under the crust is a layer of semi-liquid rock. This is called the mantle.

The centre of the Earth is called the core. The outer part is made of hot, liquid metals. It is about 2,000 km thick.

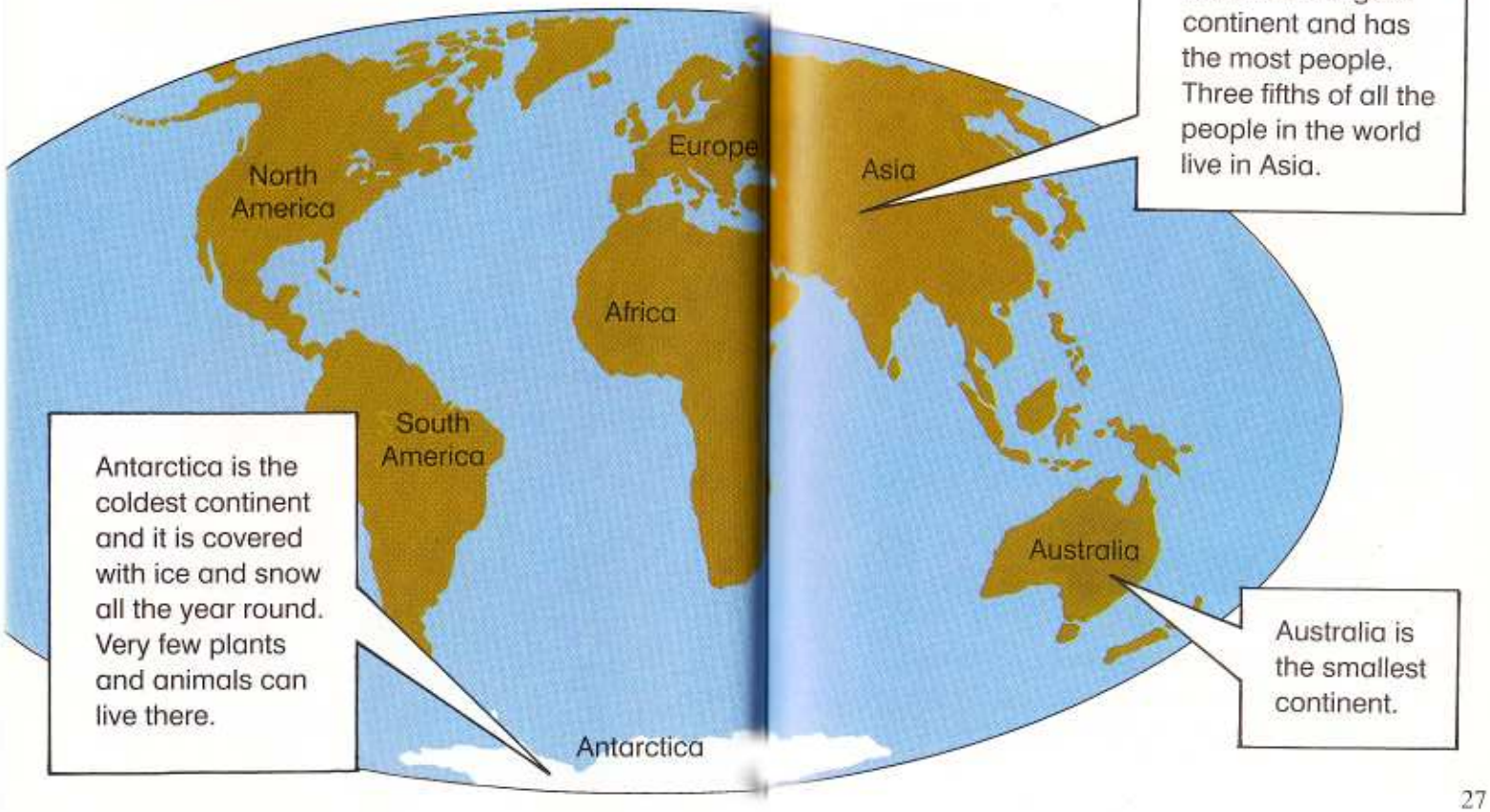
The inner part of the core is a ball of very hot metal. It is about 2,400 km across.



The Earth's crust

The Earth's crust is made of solid rock, up to 40 km thick in places. The part of the crust we can see is split into seven huge pieces of land, called **continents**.

The continents are North America, South America, Europe, Africa, Asia, Australia and Antarctica.



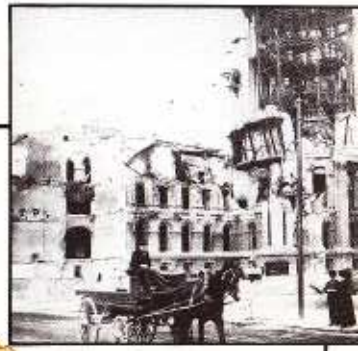
Earthquakes

There are cracks in the Earth's crust called fault lines. If the pieces of land on either side of a fault line crash into each other or jerk apart, the ground trembles. This is an earthquake.

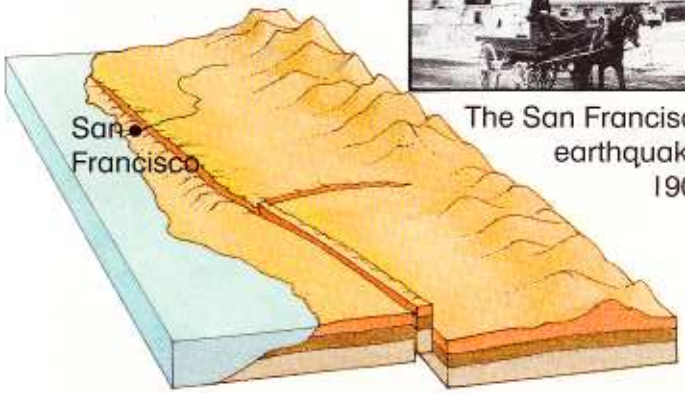
Earthquake in Mexico City, 1985

Some earthquakes cause terrible damage. In just a few minutes they can destroy whole cities, killing thousands of people.

During an earthquake, huge cracks may appear in the ground, swallowing up cars, people and even buildings.



The San Andreas Fault, California, USA



The San Francisco earthquake, 1906

The San Andreas Fault in America is over 1,000 km long. The city of San Francisco lies on the fault line. In 1906 and 1989 there were huge earthquakes there.

There are about a million earthquakes every year. Many happen under the sea, where the Earth's crust is very thin.

Mountains

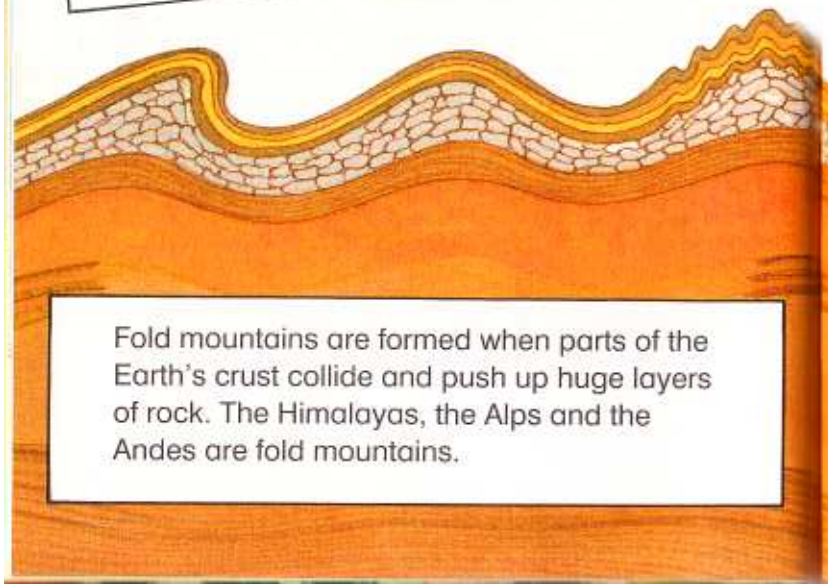
Some parts of the Earth's surface are flat, but in other places there are high mountains.

Mount Everest in the Himalayas is the highest mountain on Earth. It is 8,848 m high.

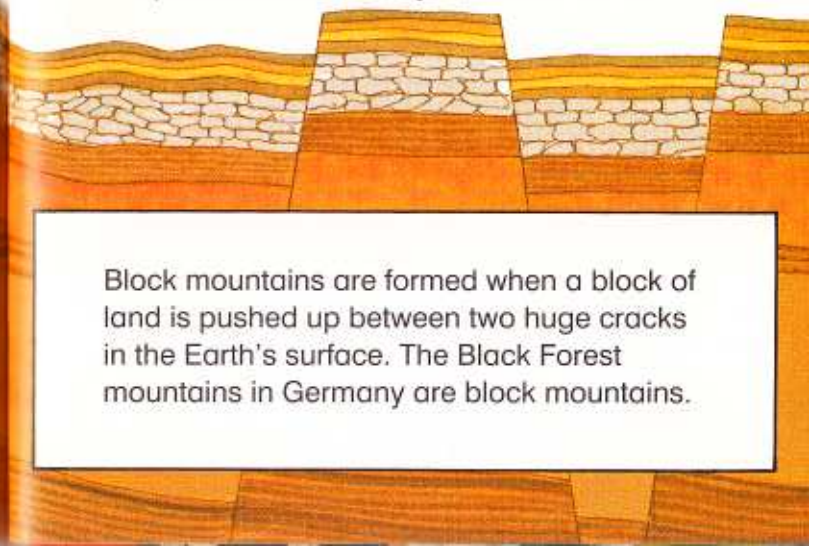
Young mountains in the Alps

Older mountains, Gwynedd, Wales

The Alps in Europe have jagged shapes. This shows that they are fairly young mountains – only a few million years old! Older mountains have more rounded shapes, worn smooth by the wind and rain.



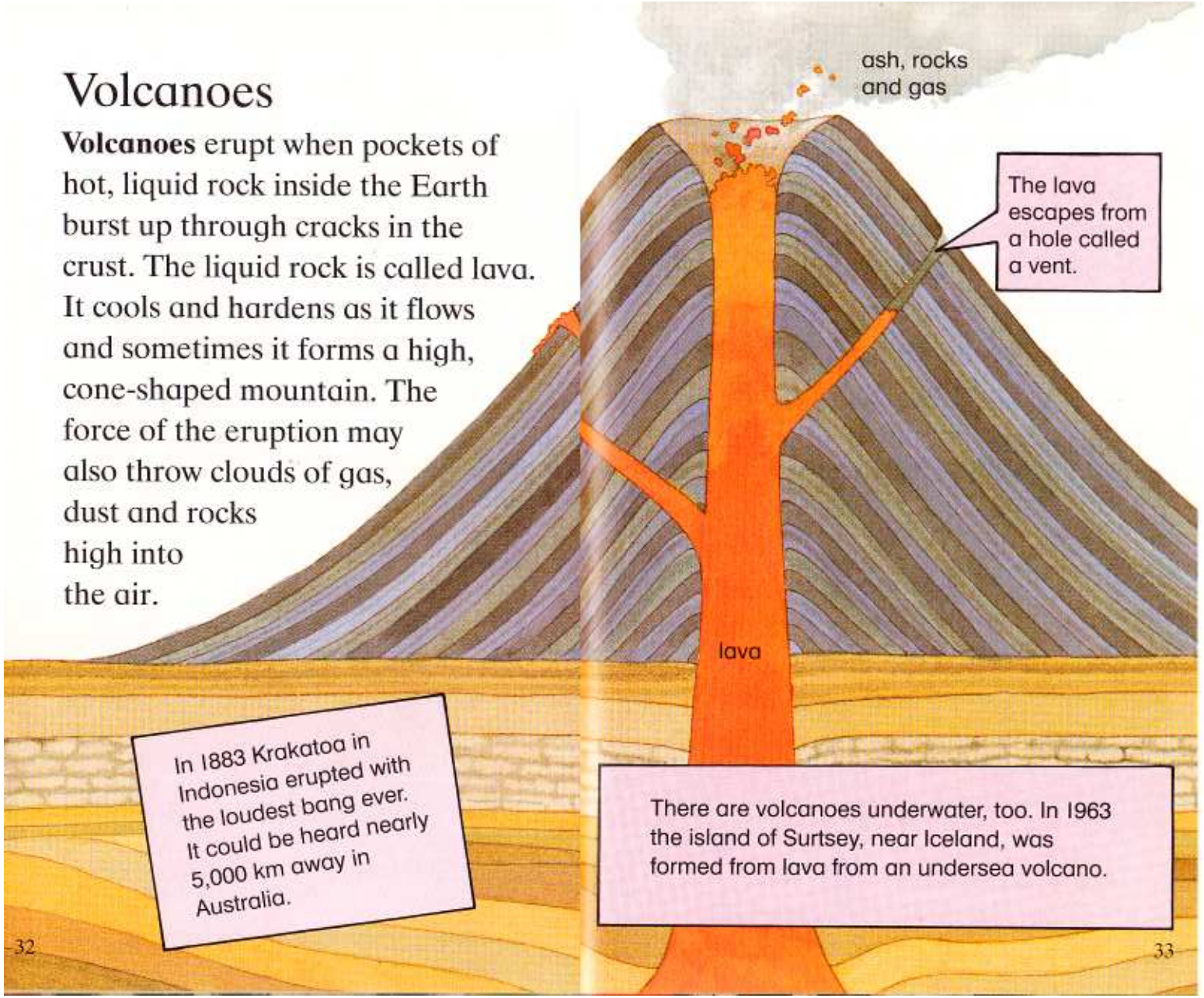
Fold mountains are formed when parts of the Earth's crust collide and push up huge layers of rock. The Himalayas, the Alps and the Andes are fold mountains.



Block mountains are formed when a block of land is pushed up between two huge cracks in the Earth's surface. The Black Forest mountains in Germany are block mountains.

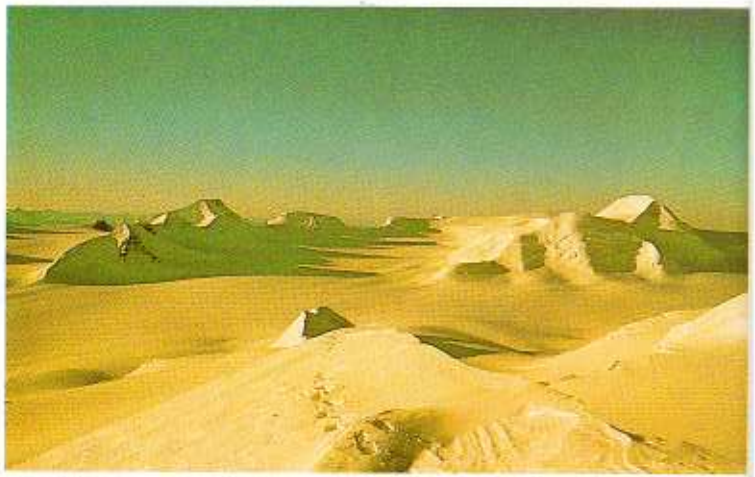
Volcanoes

Volcanoes erupt when pockets of hot, liquid rock inside the Earth burst up through cracks in the crust. The liquid rock is called lava. It cools and hardens as it flows and sometimes it forms a high, cone-shaped mountain. The force of the eruption may also throw clouds of gas, dust and rocks high into the air.



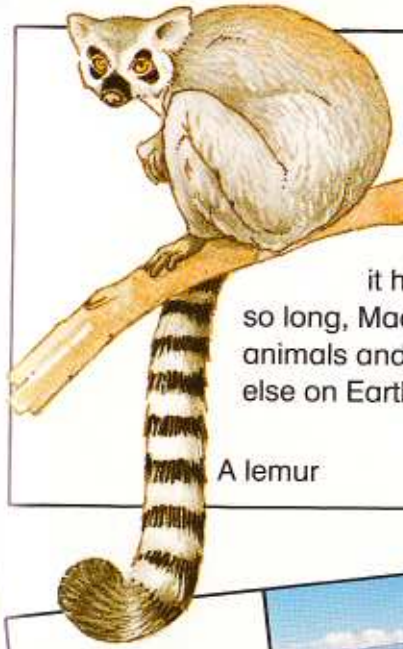
Islands

Islands are pieces of land surrounded by water. Islands are formed in many different ways. Some are the tips of underwater mountains or volcanoes. Some are made of **coral**. Others were once part of continents and broke off millions of years ago.



Greenland

Greenland is the world's largest island. It is nearly four times bigger than France.



The island of Madagascar was once part of the continent of Africa. Because it has been separate for so long, Madagascar has many animals and plants found nowhere else on Earth.

A lemur

The islands of Hawaii are the tips of underwater volcanoes.

In warmer seas there are many small coral islands. These islands are mainly made up of the skeletons of tiny sea animals.

Great Barrier Reef, Australia

Wearing away the land

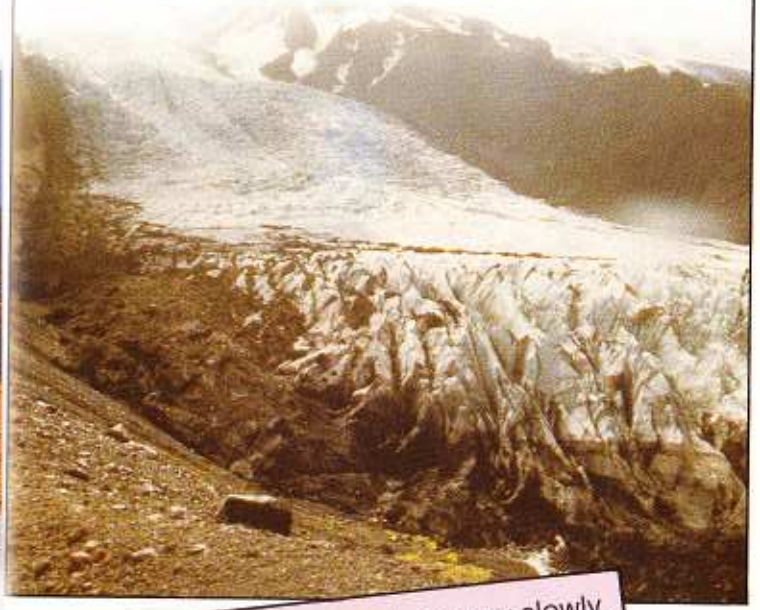
The Earth's surface is always being worn away by wind, rain and frost. Hot days and cold nights weaken rocks so that they crack. Plants then grow in the cracks and widen them.

Tassili n'Ajjer

In the desert, sand blown by the wind wears rocks into unusual shapes. The huge cliffs of Tassili n'Ajjer in the Sahara Desert were formed in this way.

In cold places, rivers of ice called glaciers slowly wear away the rocks they flow over.

This is a glacier in Iceland. The ice scrapes away the land, carrying pieces of rock with it.



Mountains are worn down very slowly. It takes about 1,000 years to wear down 8 cm.

Natural resources

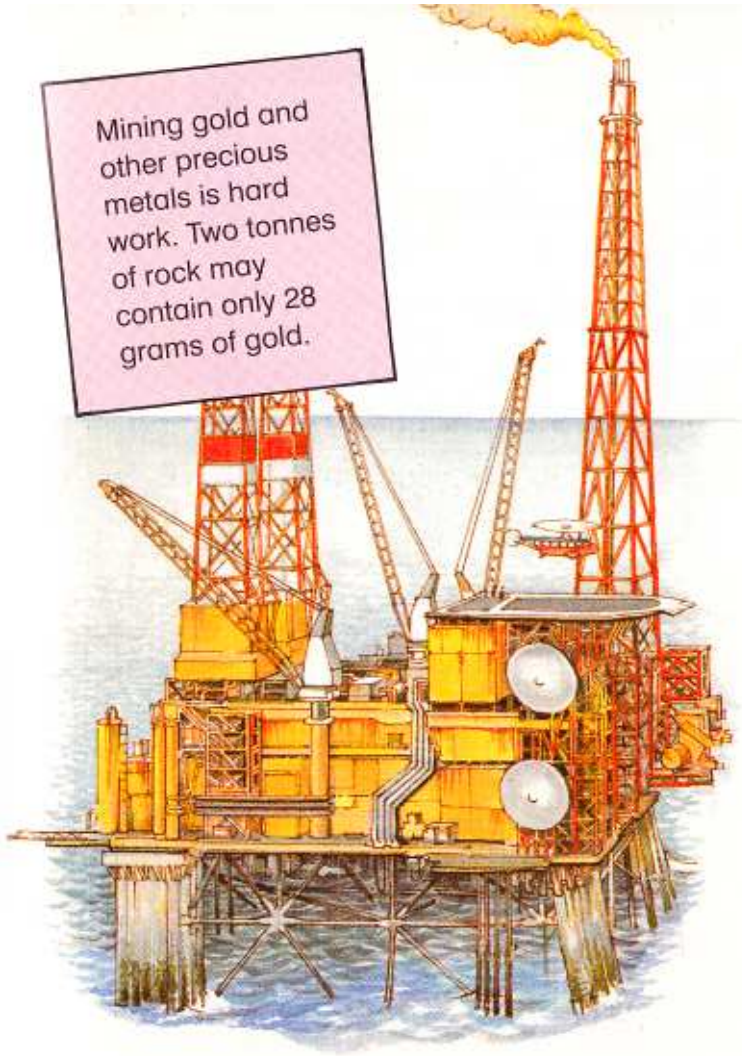
The Earth supplies us with many fuels and other materials. These are called natural resources.

We use oil, gas and coal from deep under the ground to make heat and light.

Cars, machines and jewellery are made from metals found in rocks in the Earth's crust.

Oil, gas and coal are **fossil fuels**. They were formed millions of years ago from the bodies of animals and plants.

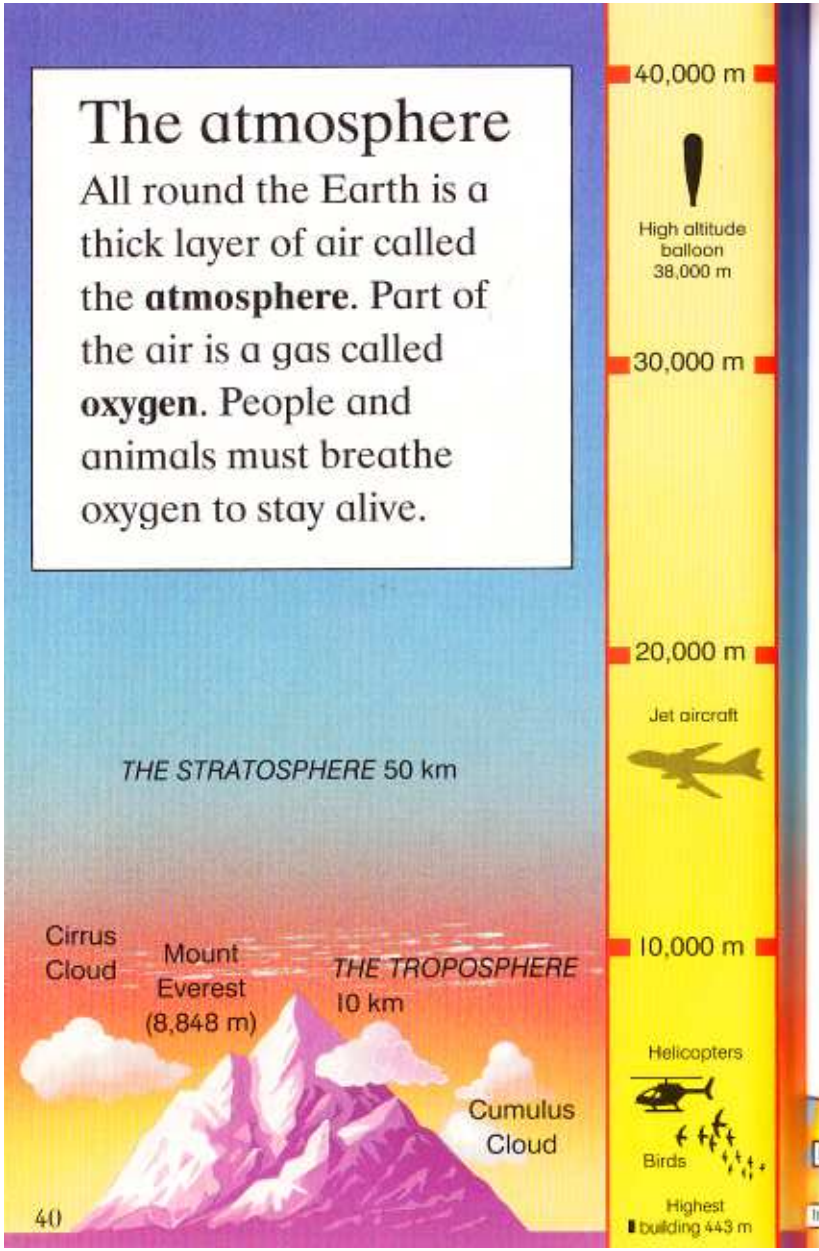
Mining gold and other precious metals is hard work. Two tonnes of rock may contain only 28 grams of gold.



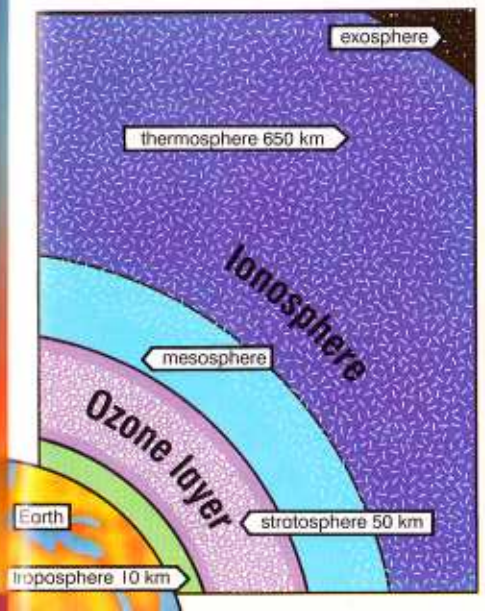
About one fifth of our oil comes from under the sea. Huge drills are used to make holes in the sea bed. Then the oil is pumped up.

The atmosphere

All round the Earth is a thick layer of air called the **atmosphere**. Part of the air is a gas called **oxygen**. People and animals must breathe oxygen to stay alive.



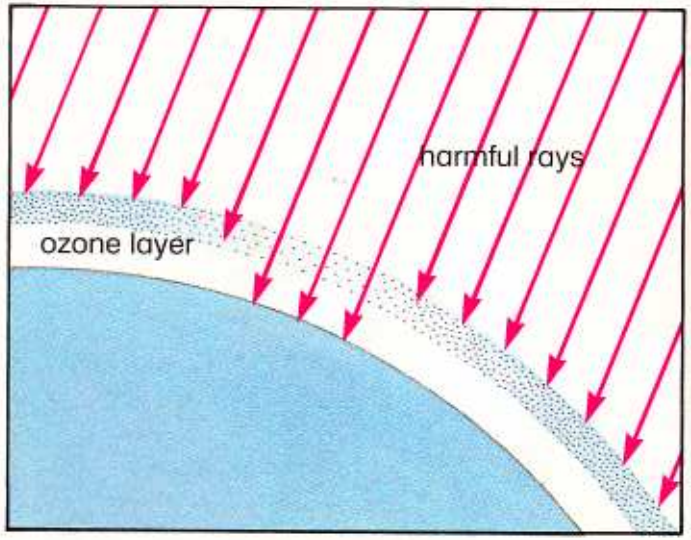
In sunlight, plants can make oxygen. Without plants, humans and other animals would soon use up all the oxygen in the air. Near the ground there is plenty of air. As you go higher and higher, there is less air.



The pilots of hot air balloons that climb high into the atmosphere must carry oxygen so that they can breathe. High in the sky, there is no air at all. Then you are in **space**.

Changing the climate

The Earth's climate may be getting warmer. Smoke and fumes from factories, power stations and cars are collecting high in the sky and forming a blanket round the Earth.



Gases called **CFCs** are also changing the climate by destroying the **ozone layer** round the Earth. This layer protects us from the Sun's harmful rays, which may damage our skin if they reach the Earth.

This blanket stops extra heat escaping from the Earth and makes the air warmer than usual. If the Earth gets too warm, the ice at the Poles may melt. This may make the seas rise and cover low-lying places.

Glossary

atmosphere The thick layer of air around the Earth.

CFCs This stands for chlorofluorocarbon gases, which are damaging the ozone layer.

climate The sort of weather a place usually gets.

continents Seven very large areas of land in the world.

coral A hard substance made up of the skeletons of tiny sea creatures.

Equator An imaginary line round the middle of the Earth.

fossil fuels Fuels such as coal, oil or natural gas, formed from the remains of plants and animals millions of years ago.

islands Pieces of land surrounded by water.

oceans The five great areas of salt water.

oxygen The gas in the air that all living things need to breathe in order to stay alive.

ozone layer The upper layer of the Earth's atmosphere containing ozone gas which blocks out some of the Sun's harmful rays.

seasons The division of the year into spring, summer, autumn and winter in temperate climates.

space All the places beyond the Earth's atmosphere.

volcanoes Cracks in the Earth's surface formed when liquid rock, gases and ash burst through the crust.

water cycle The way in which water is used over and over again in nature.

water vapour The invisible gas formed when water is heated. Water vapour is always present in the air.

weather Rain, snow, fog, ice, wind, sunshine and other changes in the air.

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